

Claims

- [c1] A castable weldable nickel-base alloy consisting essentially of, by weight, 10% to 25% cobalt, 20% to 28% chromium, 1% to 3% tungsten, 0.5% to 1.5% aluminum, 1.5% to 2.8% titanium, 0.8% to 1.45% columbium, tantalum in an amount less than columbium and $Cb + 0.508Ta$ is 1.15% to 1.45%, 0.001% to 0.025% boron, up to 0.4% zirconium, 0.02% to 0.15% carbon, with the balance essentially nickel and incidental impurities.
- [c2] The alloy according to claim 1, wherein the columbium content is at least 1.25%.
- [c3] The alloy according to claim 1, wherein the tantalum content is less than 0.5%.
- [c4] The alloy according to claim 1, wherein the tantalum content is about 0.0%.
- [c5] The alloy according to claim 1, wherein the cobalt content is 18.5% to 19.5%, the chromium content is 22.2% to 22.8%, the tungsten content is 1.8% to 2.2%, the aluminum content is 1.1% to 1.3%, the titanium content is 2.2% to 2.4%, the boron content is 0.002% to 0.015%, the zirconium content is 0.005% to 0.4%, and the carbon content is 0.08% to 0.12%.
- [c6] The alloy according to claim 1, wherein the alloy contains at least 18 volume percent of a gamma-prime precipitate phase.
- [c7] The alloy according to claim 1, wherein the alloy is in the form of a cast nozzle of a gas turbine engine.
- [c8] The alloy according to claim 7, wherein the nozzle is installed in a second or third turbine stage of the gas turbine engine.
- [c9] A castable weldable nickel-base alloy consisting essentially of, by weight, 18.5% to 19.5% cobalt, 22.2% to 22.8% chromium, 1.8% to 2.2% tungsten, 1.1% to 1.3% aluminum, 2.2% to 2.4% titanium, 0.9% to 1.45% columbium, less than 0.5% tantalum and $Cb + 0.508Ta$ is 1.15% to 1.45%, 0.002% to 0.015% boron, 0.005% to 0.4% zirconium, 0.08% to 0.12% carbon, with the balance essentially nickel and incidental impurities.
- [c10] The alloy according to claim 9, wherein the tantalum content is about 0.0%.

- [c11] The alloy according to claim 9, wherein the alloy is free of tantalum.
- [c12] The alloy according to claim 9, wherein the columbium content is about 1.3%.
- [c13] The alloy according to claim 9, wherein the alloy contains about 25 to about 38 volume percent of a gamma-prime precipitate phase.
- [c14] The alloy according to claim 9, wherein the alloy is in the form of a cast nozzle of a gas turbine engine.
- [c15] The alloy according to claim 14, wherein the nozzle is installed in a second or third turbine stage of the gas turbine engine.
- [c16] A castable weldable nickel-base alloy consisting essentially of, by weight, about 19% cobalt, about 22.5% chromium, about 2% tungsten, about 1.2% aluminum, about 2.3% titanium, about 1.3% columbium, about 0.0% tantalum, about 0.01% boron, about 0.01% zirconium, about 0.1% carbon, with the balance essentially nickel and incidental impurities.
- [c17] The alloy according to claim 16, wherein the alloy is free of tantalum.
- [c18] The alloy according to claim 16, wherein the alloy contains about 33 to about 38 volume percent of a gamma-prime precipitate phase.
- [c19] The alloy according to claim 16, wherein the alloy is in the form of a cast nozzle of a gas turbine engine.
- [c20] The alloy according to claim 19, wherein the nozzle is installed in a second or third turbine stage of the gas turbine engine.